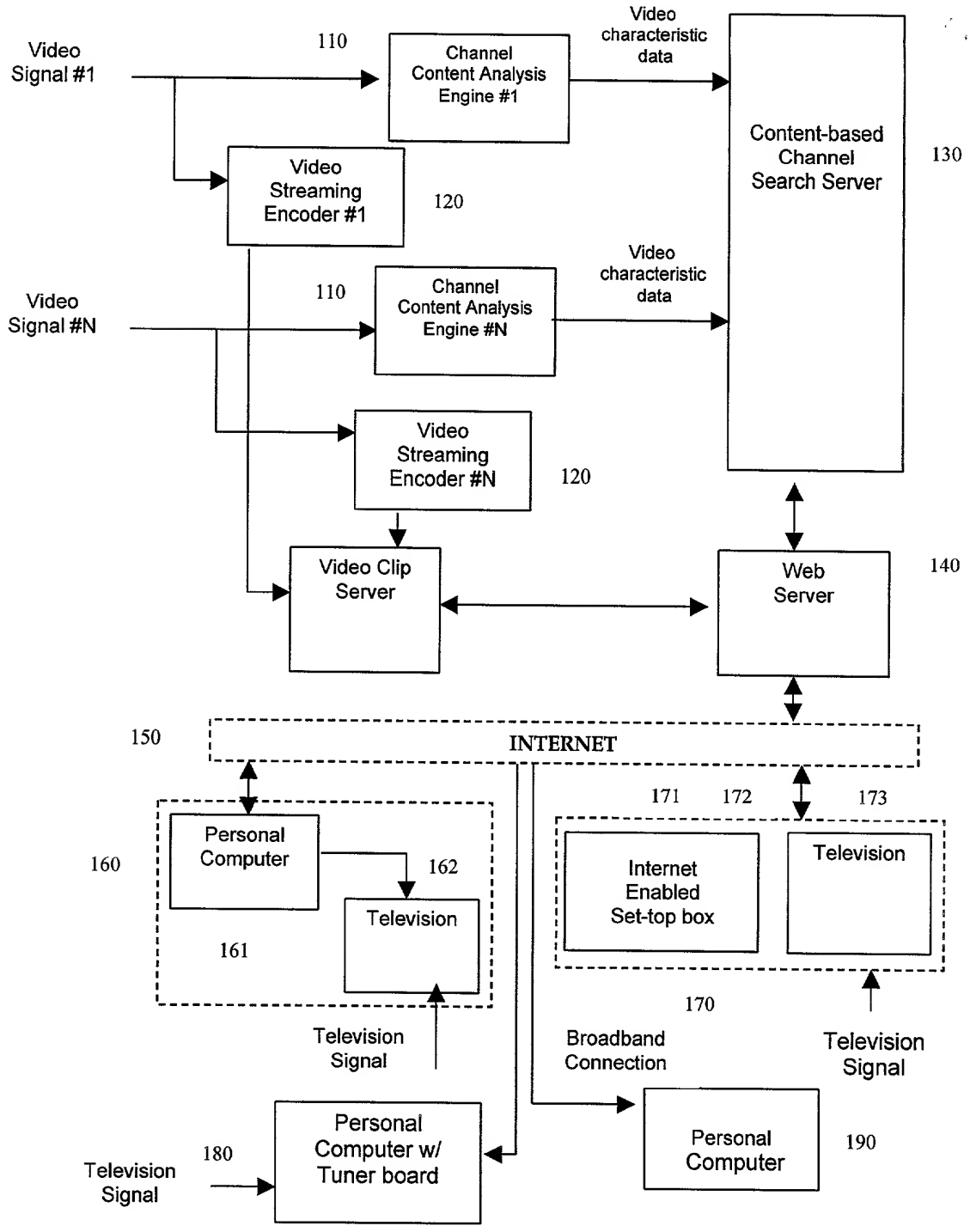

Video Signal #1
110
Channel Content Analysis Engine #1
Video characteristic data
Content-based Channel Search Server
130
Video Streaming Encoder #1
120
Video Signal #N
110
Channel Content Analysis Engine #N
Video characteristic data
Video Streaming Encoder #N
120
Video Clip Server
Web Server
140
150
INTERNET
171
172
173
Personal Computer
160
162
Television
161
Internet Enabled Set-top box
Television
170
Television Signal
Broadband Connection
Television Signal
Personal Computer w/ Tuner board
180
Television Signal
Personal Computer
190

FIG 1

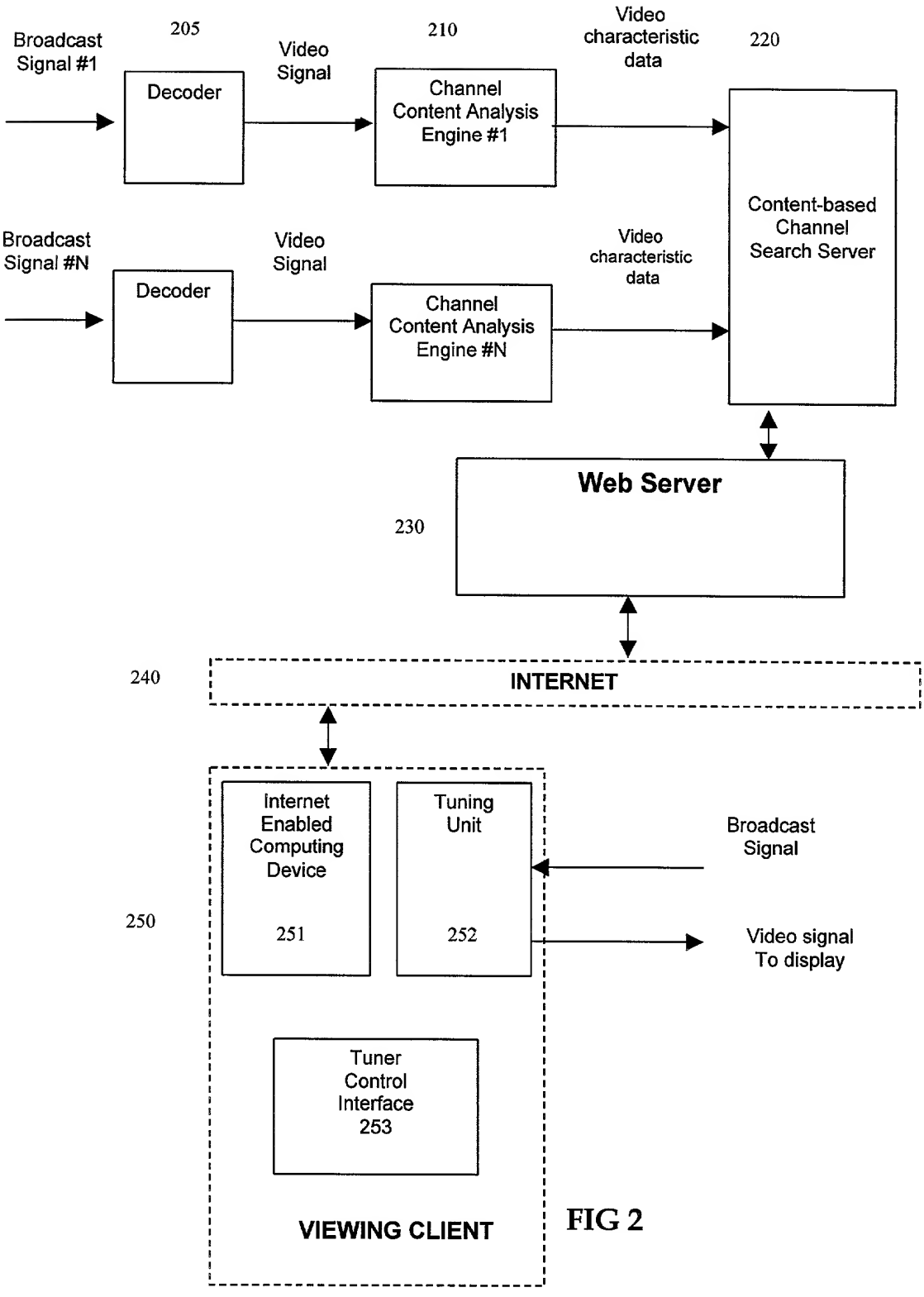

Broadcast Signal #1
205
Decoder
Video Signal
210
Channel Content Analysis Engine #1
Video characteristic data
220
Content-based Channel Search Server
Broadcast Signal #N
Decoder
Video Signal
Channel Content Analysis Engine #N
Video characteristic data
Web Server
230
240
INTERNET
Internet Enabled Computing Device
251
Tuning Unit
252
Broadcast Signal
250
Video signal To display
Tuner Control Interface 253
VIEWING CLIENT

FIG 2

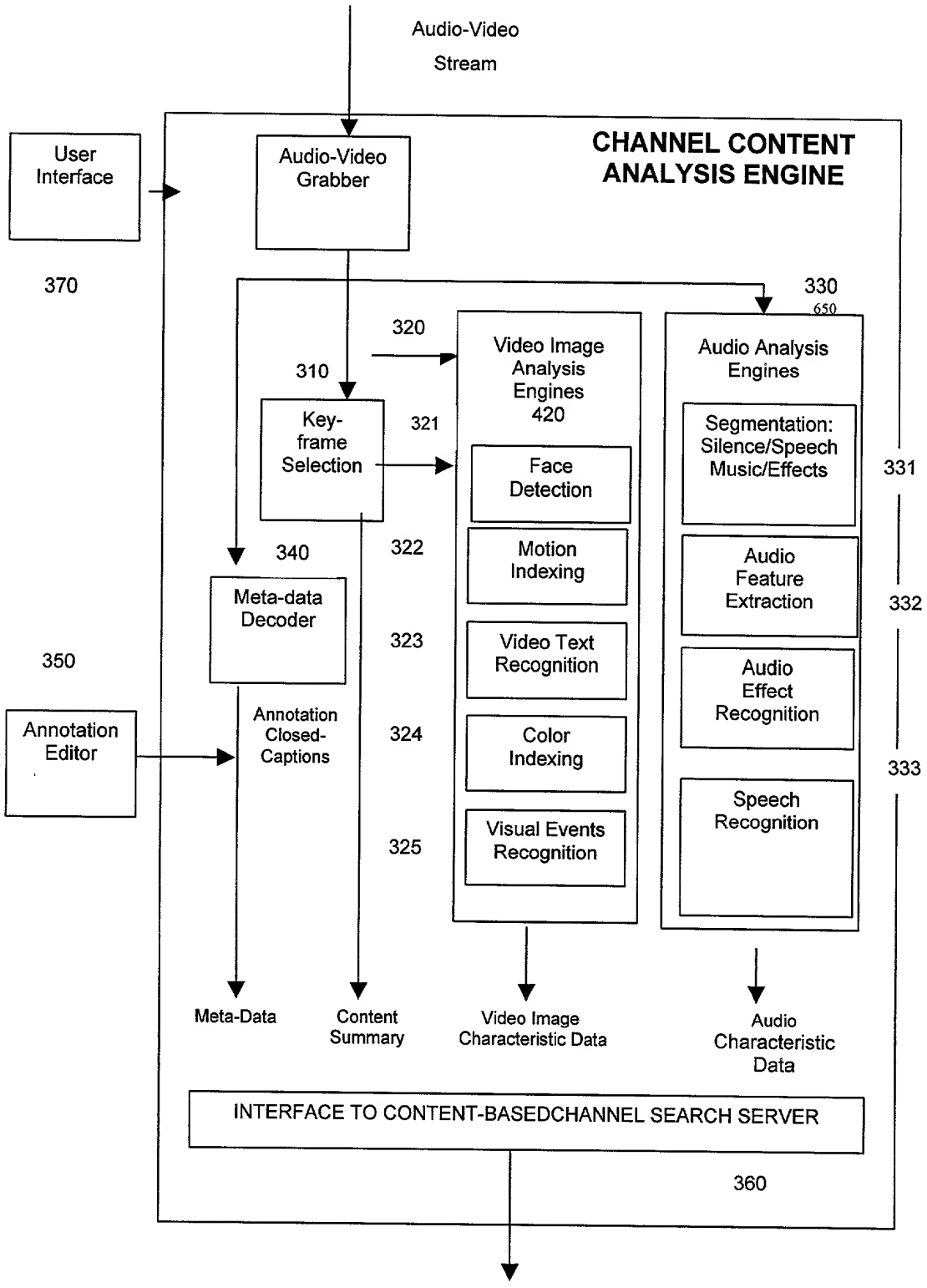

Audio-Video
Stream
CHANNEL CONTENT
ANALYSIS ENGINE
User
Interface
Audio-Video
Grabber
370
330
650
320
310
Video Image
Analysis
Engines
420
Audio Analysis
Engines
Key-
frame
Selection
321
Face
Detection
Segmentation:
Silence/Speech
Music/Effects
331
340
322
Motion
Indexing
Audio
Feature
Extraction
332
Meta-data
Decoder
323
Video Text
Recognition
Audio
Effect
Recognition
350
Annotation
Editor
Annotation
Closed-
Captions
324
Color
Indexing
333
Speech
Recognition
325
Visual Events
Recognition
Meta-Data
Content
Summary
Video Image
Characteristic Data
Audio
Characteristic
Data
INTERFACE TO CONTENT-BASEDCHANNEL SEARCH SERVER
360

FIG 3

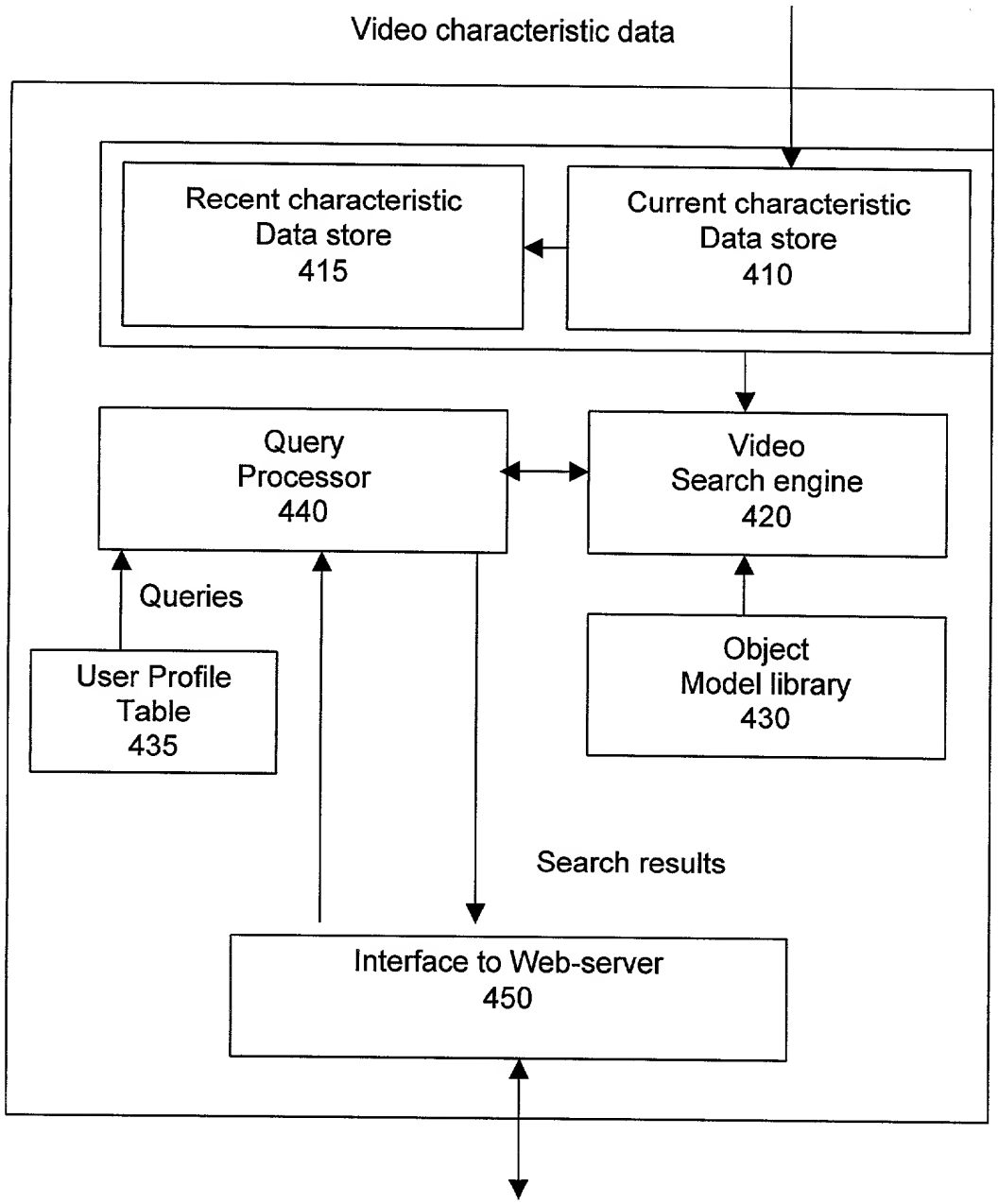


Fig. 4: Content-based channel search server

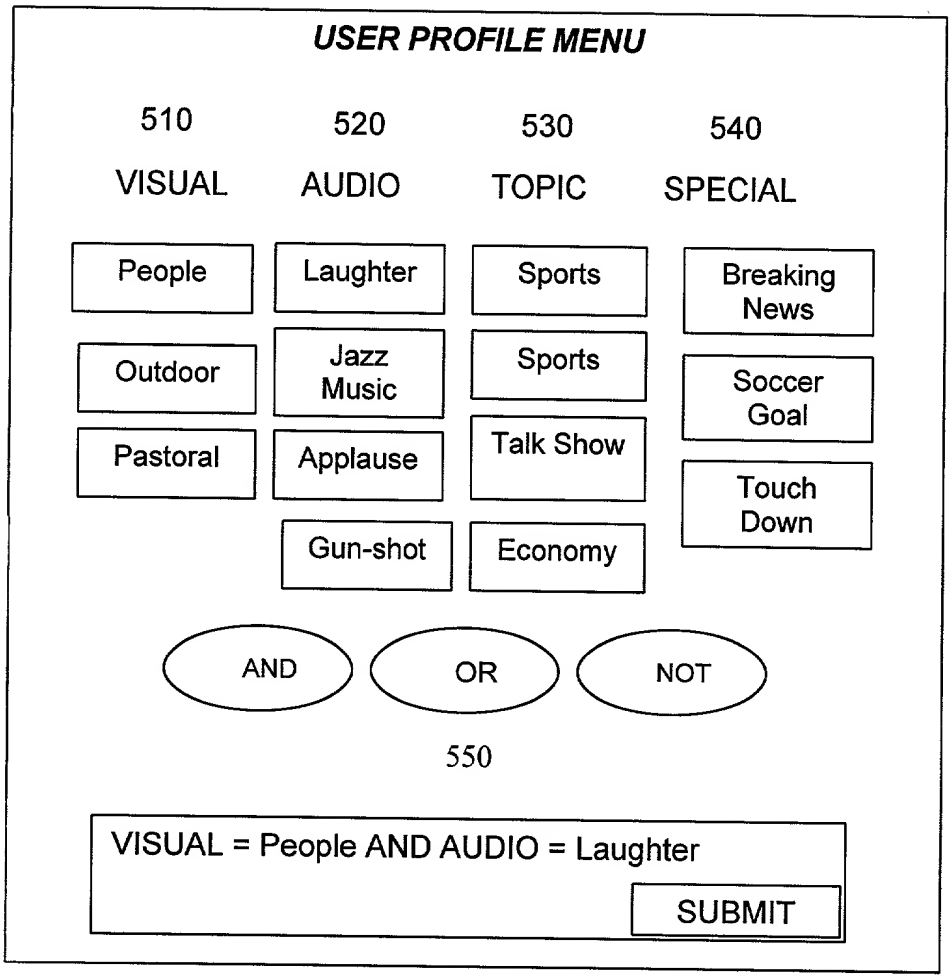

USER PROFILE MENU
510
520
530
540
VISUAL
AUDIO
TOPIC
SPECIAL
500
People
Laughter
Sports
Breaking News
Outdoor
Jazz Music
Sports
Soccer Goal
Pastoral
Applause
Talk Show
Touch Down
Gun-shot
Economy
AND
OR
NOT
550
VISUAL = People AND AUDIO = Laughter
SUBMIT

FIG 5.1

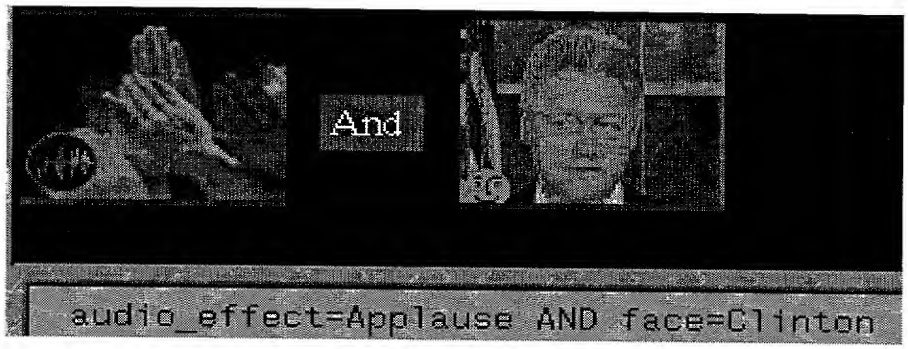

And
audio_effect=Applause AND face=Clinton

FIG 5.2

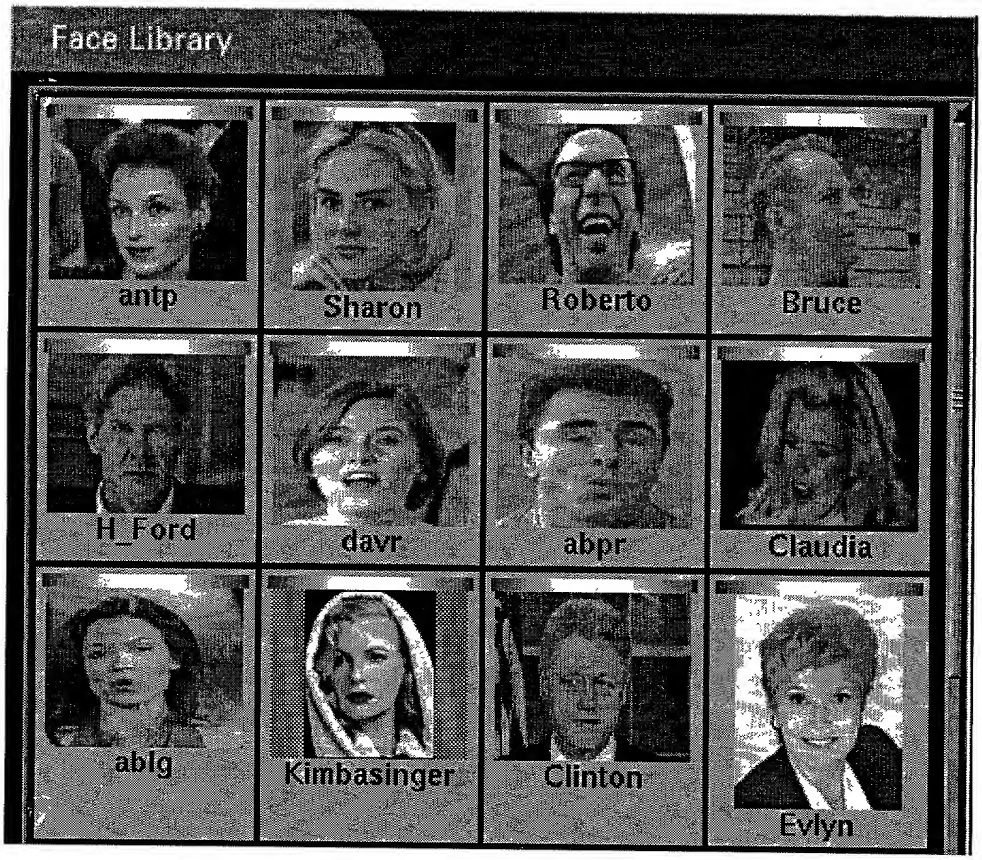

Face Library
antp
Sharon
Roberto
Bruce
H_Ford
davr
abpr
Claudia
ablg
Kimbasinger
Clinton
Evlyn

FIG 6

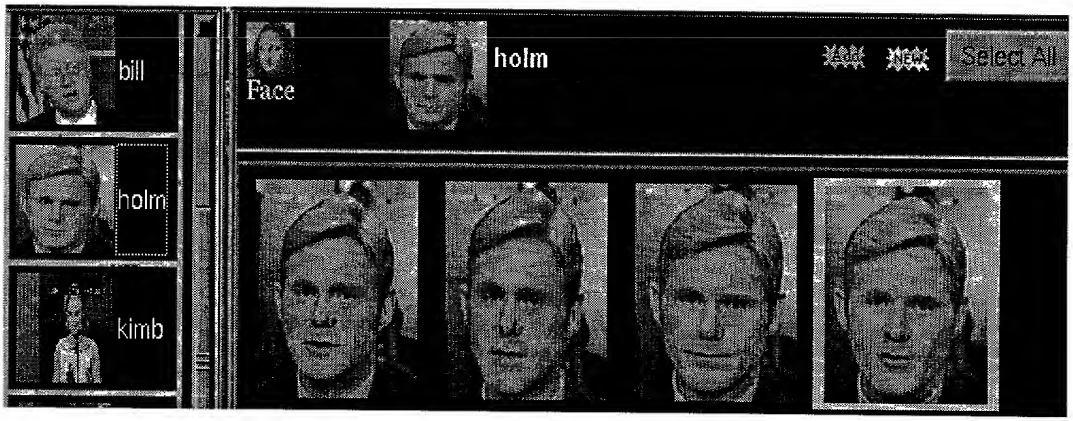

bill
holm
kimb
Face
holm
Select All

FIG 7

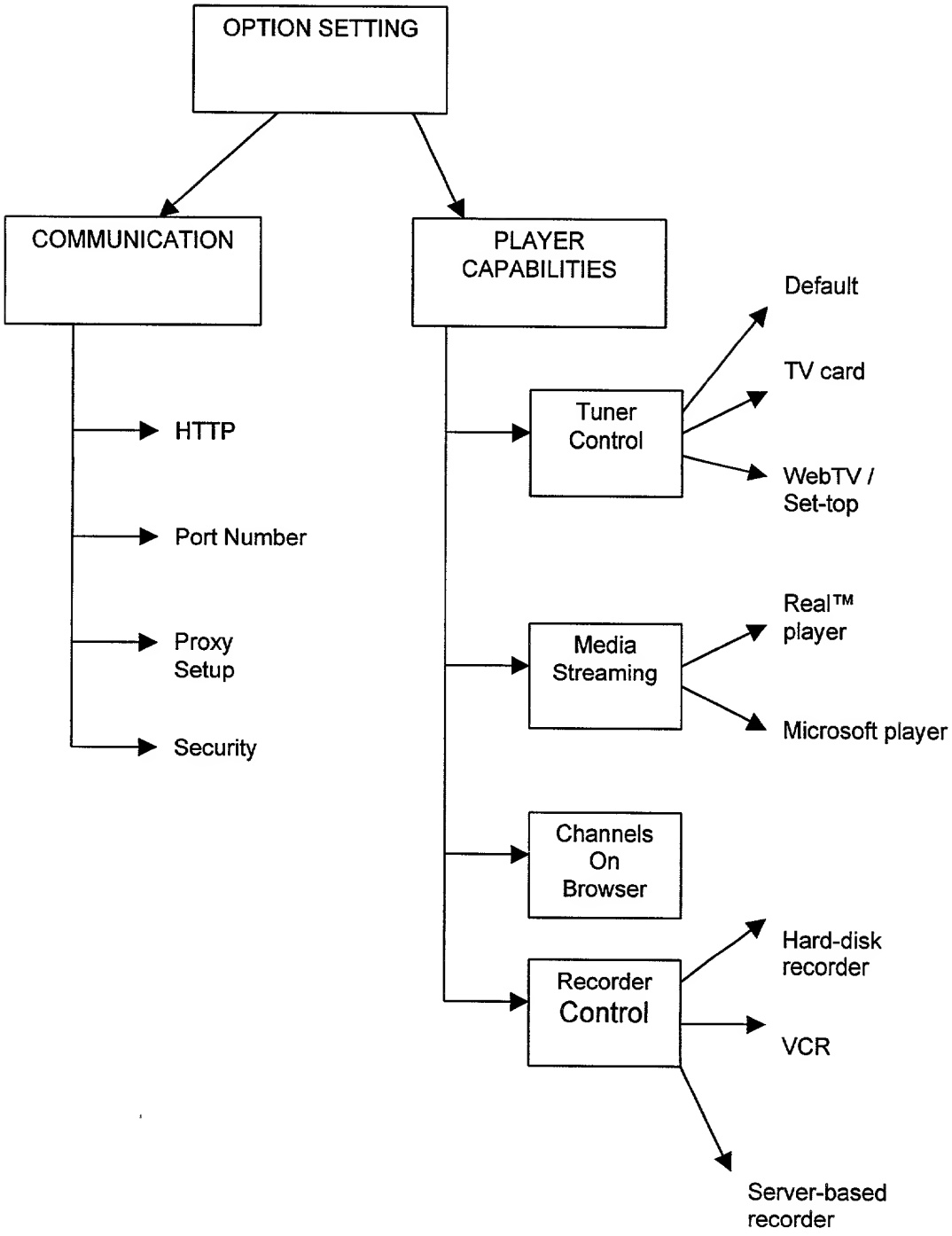

OPTION SETTING
COMMUNICATION
PLAYER CAPABILITIES
HTTP
Port Number
Proxy Setup
Security
Tuner Control
Default
TV card
WebTV / Set-top
Media Streaming
Real™ player
Microsoft player
Channels On Browser
Recorder Control
Hard-disk recorder
VCR
Server-based recorder

FIG 8

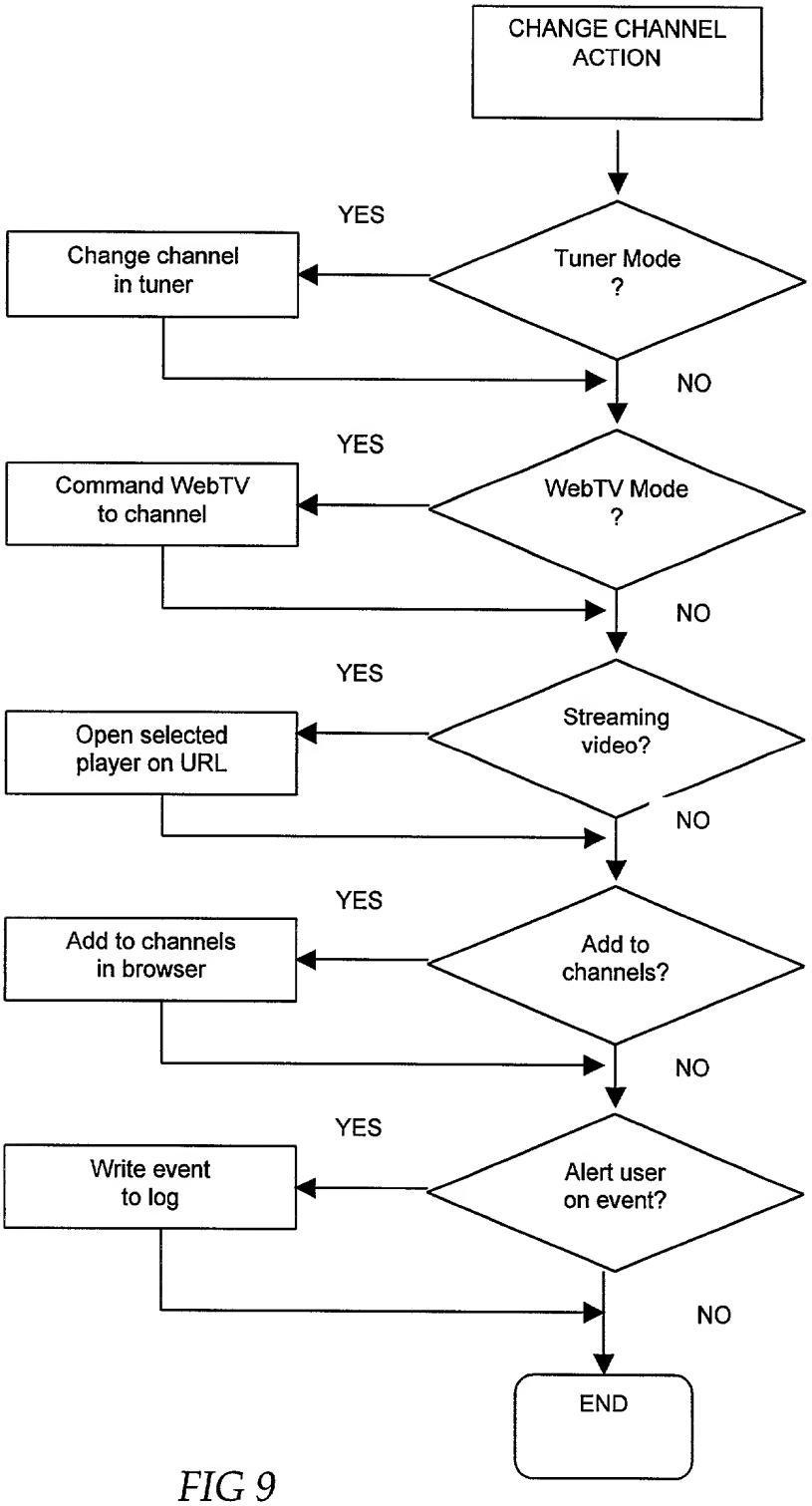

CHANGE CHANNEL ACTION
Tuner Mode ?
YES
Change channel in tuner
NO
WebTV Mode ?
YES
Command WebTV to channel
NO
Streaming video?
YES
Open selected player on URL
NO
Add to channels?
YES
Add to channels in browser
NO
Alert user on event?
YES
Write event to log
NO
END

FIG 9

FIG 10a: FILE CONNECTION MENU

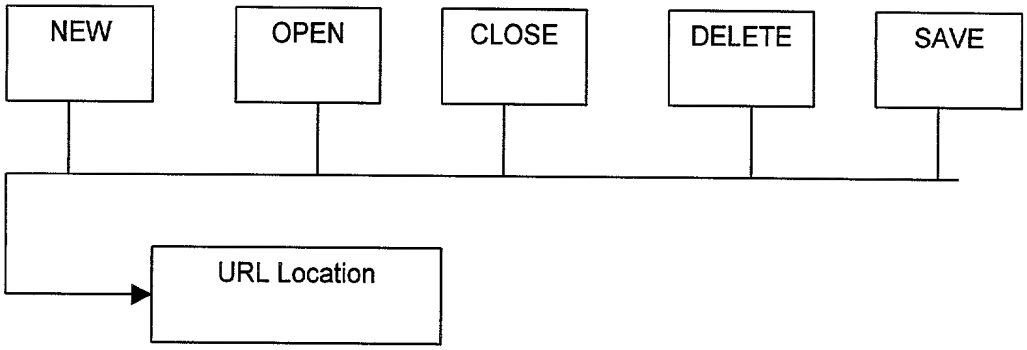
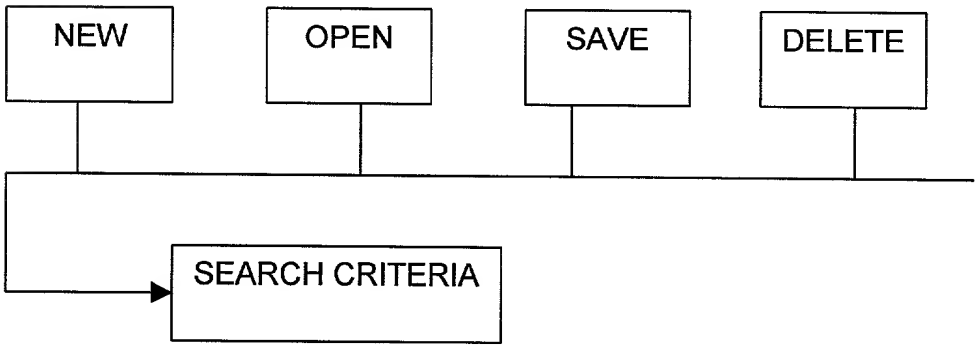


FIG 10b: EDIT SEARCH PROPERTIES MENU



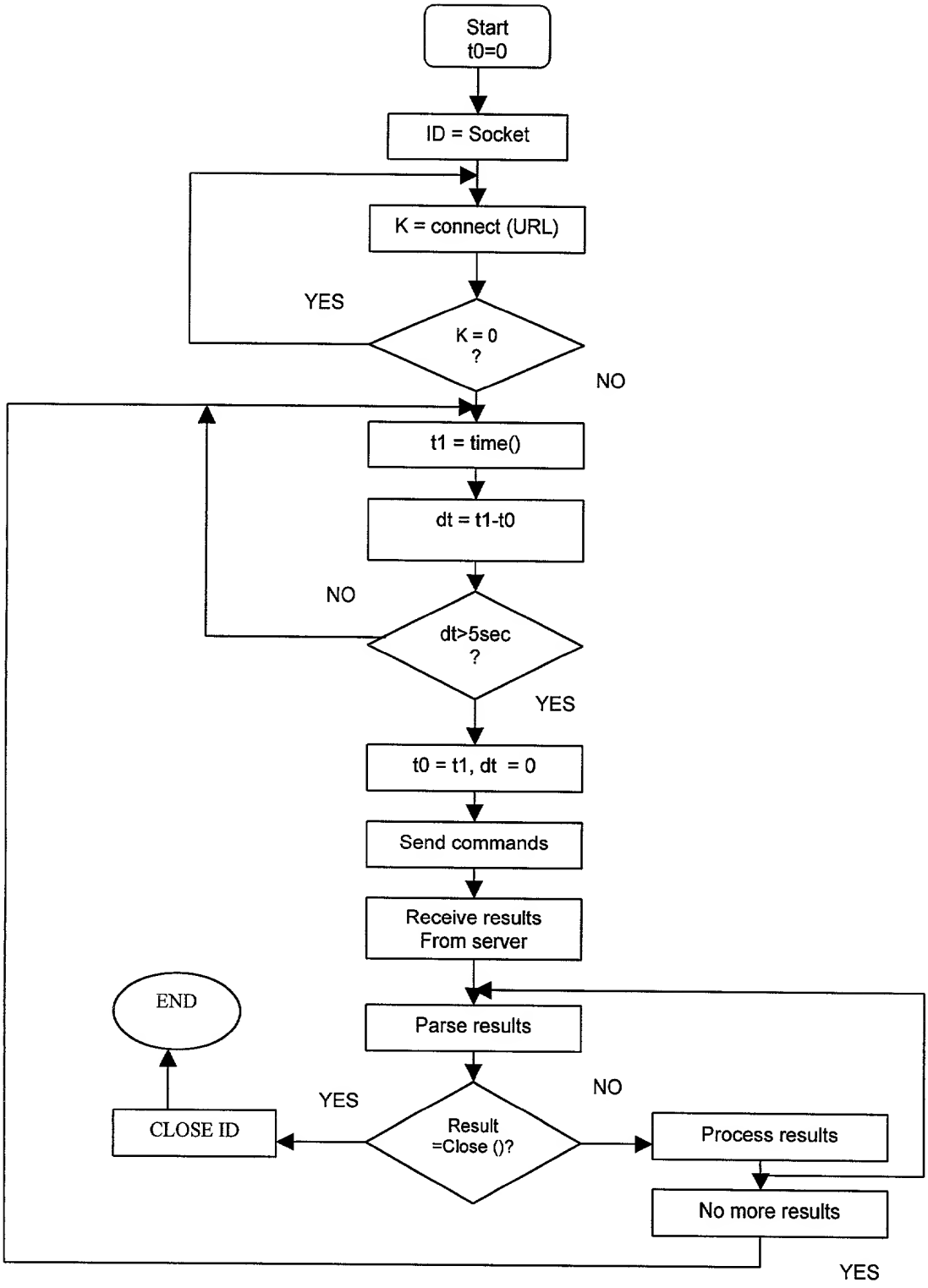


FIG 11: CLIENT
COMMUNICATION MODULE

FIG 12: SERVER COMM. MODULE

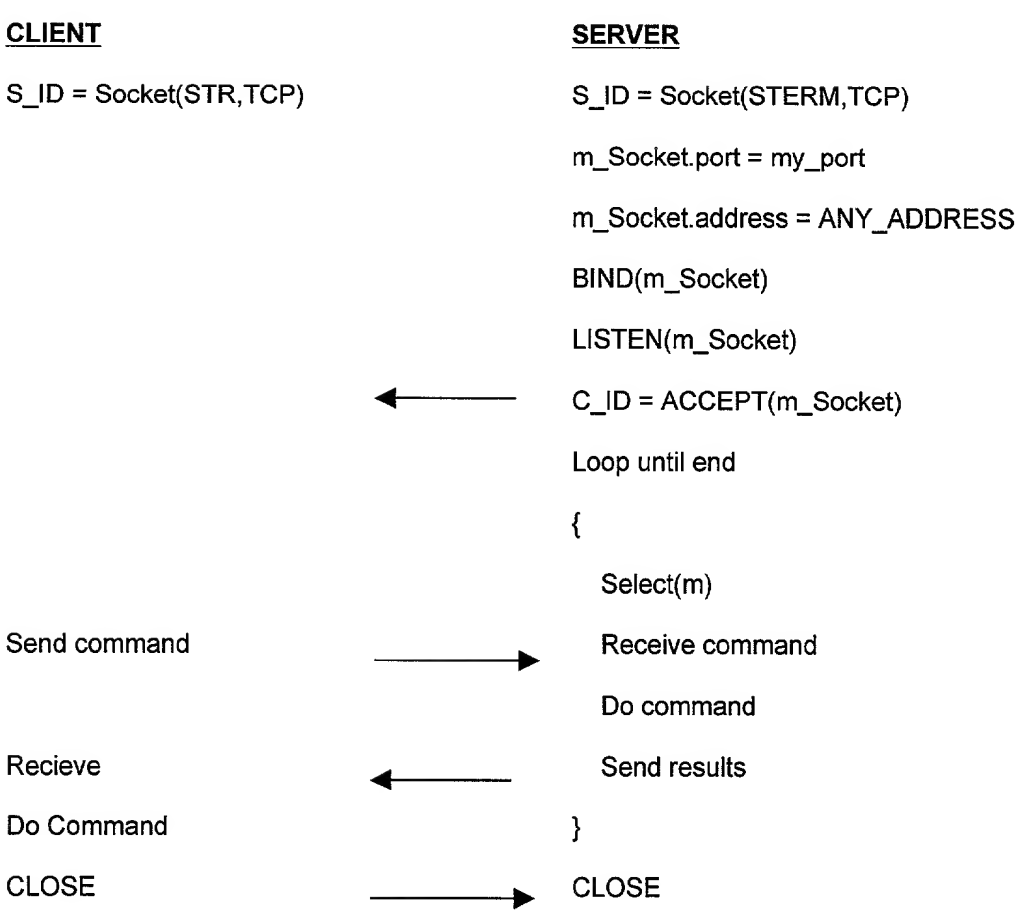
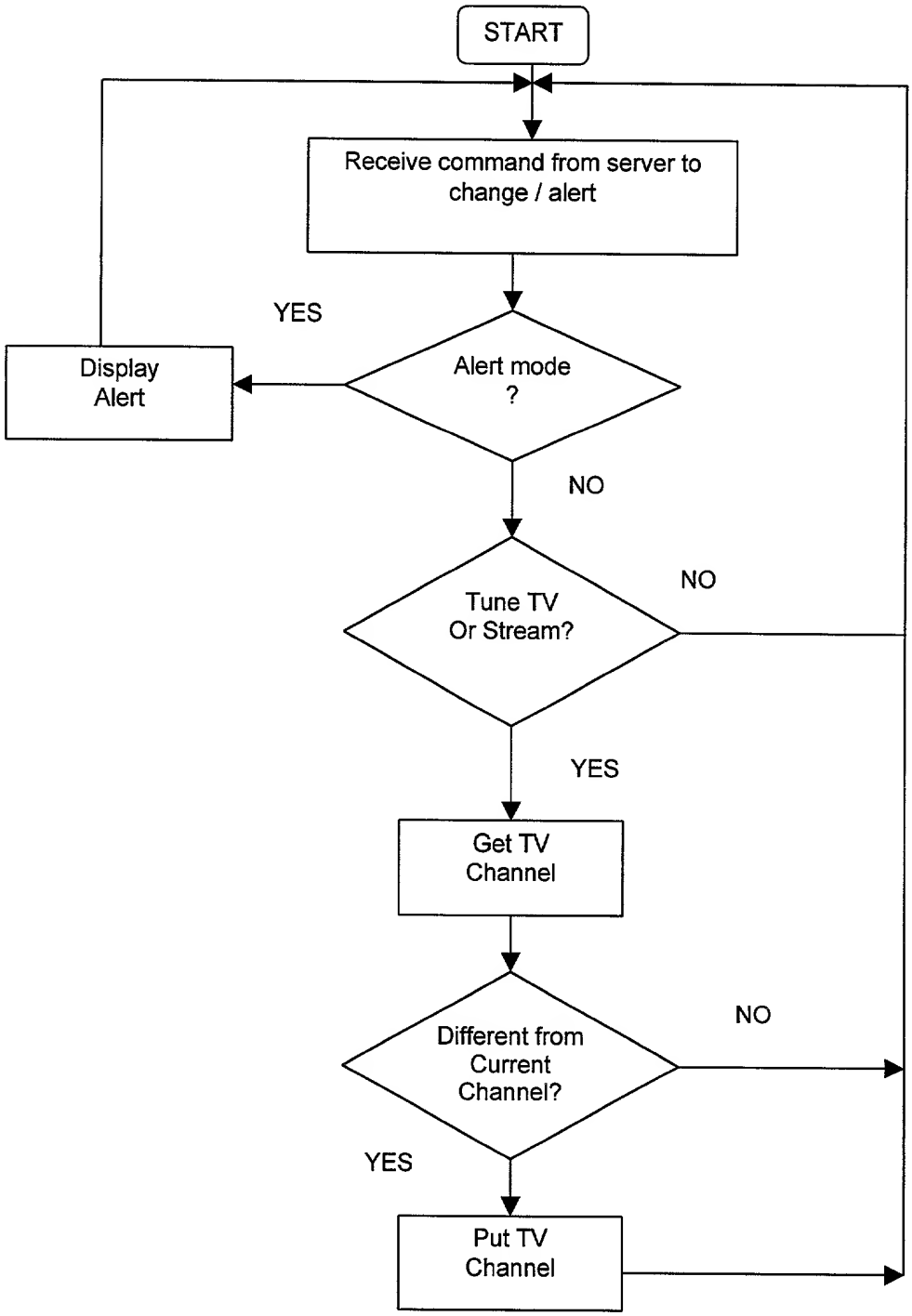


FIG 13: TUNER SETTING BY CLIENT



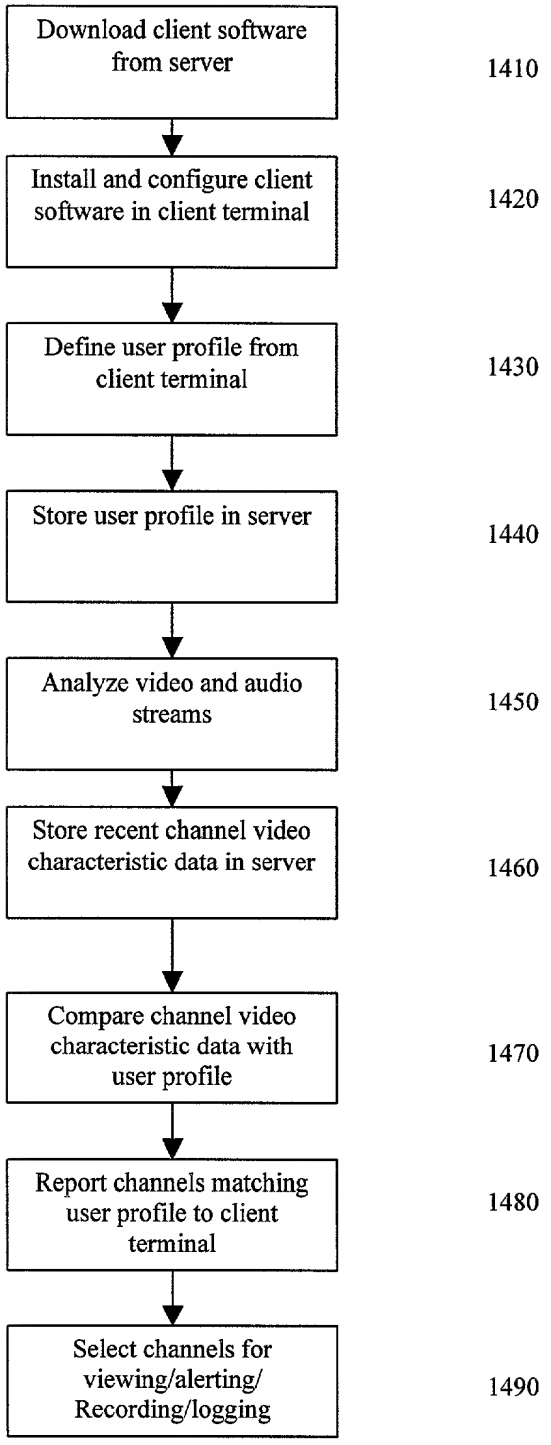


FIG. 14: Summary flow chart of operation